R Notebook

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1. CRÉATION DE LA VARIABLE TEMPS

```
date()
```

```
## [1] "Wed Jan 19 16:00:46 2022"
```

```
dates = c("17/02/18", "27/02/18", "14/01/18", "28/02/18")
dates
```

```
## [1] "17/02/18" "27/02/18" "14/01/18" "28/02/18"
```

```
class(dates)
```

```
## [1] "character"
```

```
dates = as.Date(dates)
print(class(dates))
```

```
## [1] "Date"
```

```
dates
```

```
## [1] "17-02-18" "27-02-18" "14-01-18" "28-02-18"
```

```
dates <- as.Date(dates, "%d/%m/%y")
dates
```

```
## [1] "17-02-18" "27-02-18" "14-01-18" "28-02-18"
```

```
difftime(dates[1], dates[4])
```

```
## Time difference of -4017 days
```

```
difftime(dates[1], dates[4],units = "s")
```

```
## Time difference of -347068800 secs
```

Générer une séquence de dates avec la fonc-tion usuelle seq

```
r d1
<-
seq(from
=
as.Date("01/01/18",
"%d/%m/%y"),
by =
"day",length.out
= 31)
d1
```

```
##
[1]
"2018-01-01"
"2018-01-02"
"2018-01-03"
"2018-01-04"
"2018-01-05"
##
[6]
"2018-01-06"
"2018-01-07"
"2018-01-08"
"2018-01-09"
"2018-01-10"
##
[11]
"2018-01-11"
"2018-01-12"
"2018-01-13"
"2018-01-14"
"2018-01-15"
##
[16]
"2018-01-16"
"2018-01-17"
"2018-01-18"
"2018-01-19"
"2018-01-20"
##
[21]
"2018-01-21"
"2018-01-22"
"2018-01-23"
"2018-01-24"
"2018-01-25"
##
[26]
"2018-01-26"
"2018-01-27"
"2018-01-28"
"2018-01-29"
"2018-01-30"
##
[31]
"2018-01-31"
```

```
r d2
<-
seq(from
=
as.Date("01/01/18",
"%d/%m/%y"),
by =
"month",length.out
= 12)
d2
##
[1]
"2018-01-01"
"2018-02-01"
"2018-03-01"
"2018-04-01"
"2018-05-01"
##
[6]
"2018-06-01"
"2018-07-01"
"2018-08-01"
"2018-09-01"
"2018-10-01"
##
[11]
"2018-11-01"
"2018-12-01"
r
d3<-seq(from=as.Date("01/01/18","%d/%m/%y"),to=
as.Date("31/01/18","%d/%m/%y"),
length.out=15)
d3
```

```
##
[1]
"2018-01-01"
"2018-01-03"
"2018-01-05"
"2018-01-07"
"2018-01-09"
##
[6]
"2018-01-11"
"2018-01-13"
"2018-01-16"
"2018-01-18"
"2018-01-20"
##
[11]
"2018-01-22"
"2018-01-24"
"2018-01-26"
"2018-01-28"
"2018-01-31"
```

On note que dans ce cas **to** et **length.out** apparaissent en même temps. Il faut calculer la longueur au préalable pour que cela tombe juste. On ne peut alors pas mettre by.

Simulation normae

```
print(length(d1))
```

```
## [1] 31
```

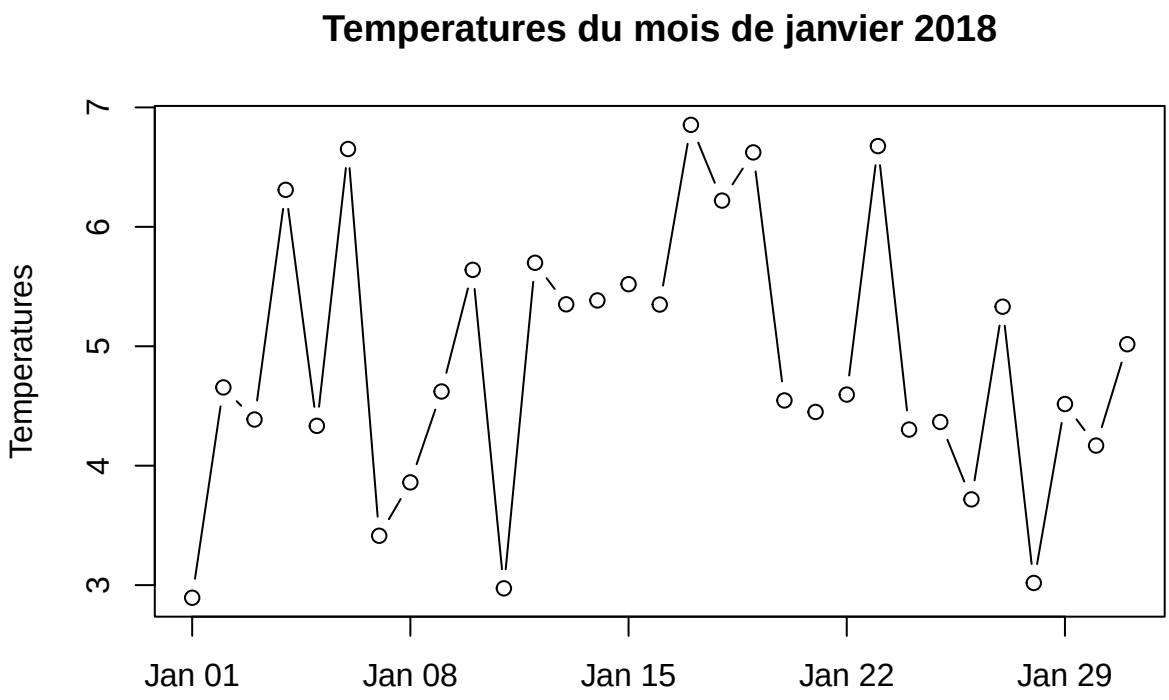
```
d1
```

```
##  [1] "2018-01-01" "2018-01-02" "2018-01-03" "2018-01-04" "2018-01-05"
##  [6] "2018-01-06" "2018-01-07" "2018-01-08" "2018-01-09" "2018-01-10"
## [11] "2018-01-11" "2018-01-12" "2018-01-13" "2018-01-14" "2018-01-15"
## [16] "2018-01-16" "2018-01-17" "2018-01-18" "2018-01-19" "2018-01-20"
## [21] "2018-01-21" "2018-01-22" "2018-01-23" "2018-01-24" "2018-01-25"
## [26] "2018-01-26" "2018-01-27" "2018-01-28" "2018-01-29" "2018-01-30"
## [31] "2018-01-31"
```

```
temperatures <- rnorm(length(d1), mean = 5)
temperatures
```

```
##  [1] 2.894120 4.655345 4.386491 6.309795 4.333559 6.651678 3.413205 3.859995
##  [9] 4.621314 5.639891 2.972924 5.699228 5.351338 5.383806 5.519767 5.349379
## [17] 6.853984 6.219960 6.623304 4.546253 4.450082 4.595402 6.675987 4.302724
## [25] 4.366102 3.717822 5.331393 3.017876 4.516297 4.168488 5.016922
```

```
plot(x=d1, y=temperatures, type="b",xlab="",ylab="Temperatures",
main="Temperatures du mois de janvier 2018")
```



FAIRE SNCF §

2. CRÉATION d'une Série Temporelle

```
temperatures
```

```
##  [1] 2.894120 4.655345 4.386491 6.309795 4.333559 6.651678 3.413205 3.859995
##  [9] 4.621314 5.639891 2.972924 5.699228 5.351338 5.383806 5.519767 5.349379
## [17] 6.853984 6.219960 6.623304 4.546253 4.450082 4.595402 6.675987 4.302724
## [25] 4.366102 3.717822 5.331393 3.017876 4.516297 4.168488 5.016922
```

```
temperature <- ts(data = temperatures, start = 0, end = 31)
temperature
```

```
## Time Series:
## Start = 0
## End = 31
## Frequency = 1
##  [1] 2.894120 4.655345 4.386491 6.309795 4.333559 6.651678 3.413205 3.859995
##  [9] 4.621314 5.639891 2.972924 5.699228 5.351338 5.383806 5.519767 5.349379
## [17] 6.853984 6.219960 6.623304 4.546253 4.450082 4.595402 6.675987 4.302724
## [25] 4.366102 3.717822 5.331393 3.017876 4.516297 4.168488 5.016922 2.894120
```

```
class(temperature)
```

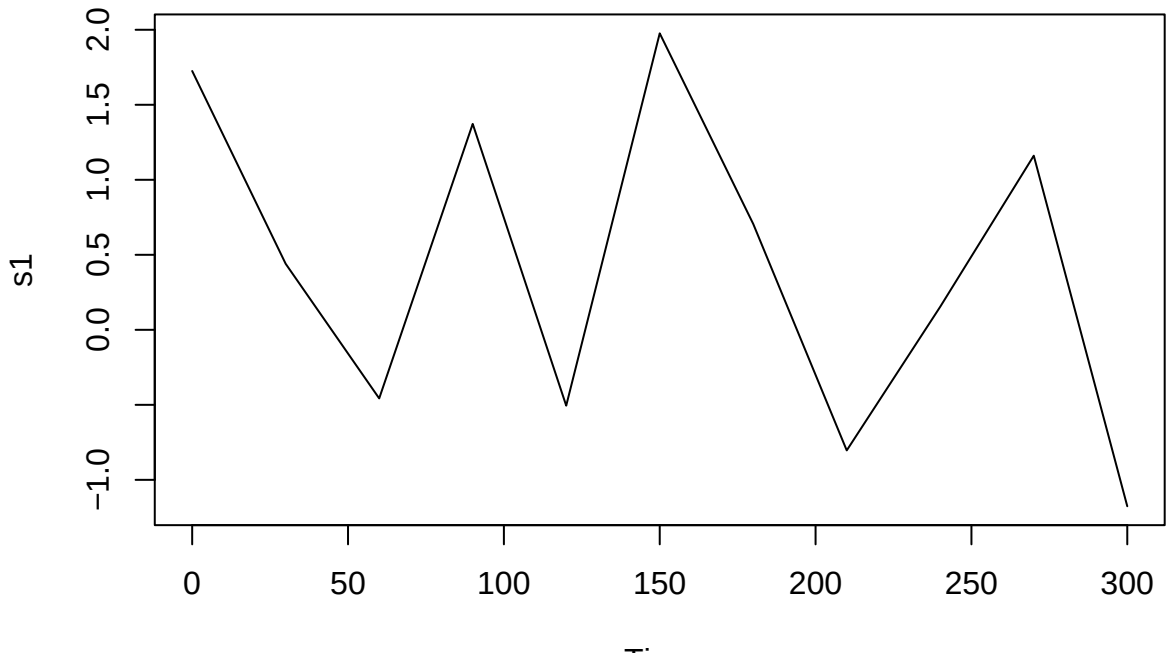
```
## [1] "ts"
```

- **Exemple : Mesures prises toutes les 30 s pendant 5 min.**

```
s1 <- ts(data=rnorm(11),start=0, end=5*60, frequency= 1/30)
s1
```

```
## Time Series:
## Start = 0
## End = 300
## Frequency = 0.0333333333333333
##  [1]  1.7253603  0.4401277 -0.4571038  1.3725924 -0.5052878  1.9762080
##  [7]  0.7054980 -0.8037342  0.1543905  1.1607759 -1.1758533
```

```
plot(s1)
```



Exemple : Données mensuelles sur 3 ans à partir de janvier 2015

```
s2 <- ts(data = rnorm(36), start = c(2015,1), frequency = 12)
s2
```

```
##               Jan          Feb          Mar          Apr          May
## 2015  0.919408493  2.069068681 -0.925653898 -0.257091874 -2.393286346
## 2016  0.010606791  0.284302867 -1.902606777  0.592686070 -0.413846281
## 2017  0.397820060  0.929489780 -0.667655590  0.242711667 -0.233378112
##               Jun          Jul          Aug          Sep          Oct
## 2015 -0.654743343 -1.144409723 -1.382115938  1.005357967 -0.761399552
## 2016 -0.029184656  1.073090646  0.675650885 -1.460961370  0.308220453
## 2017  0.960872705 -0.008510252 -1.993731308 -0.253578889  0.889861902
##               Nov          Dec
## 2015  0.135197253  0.198967625
## 2016 -0.544459123 -1.209771587
## 2017  0.182839256 -1.233479929
```

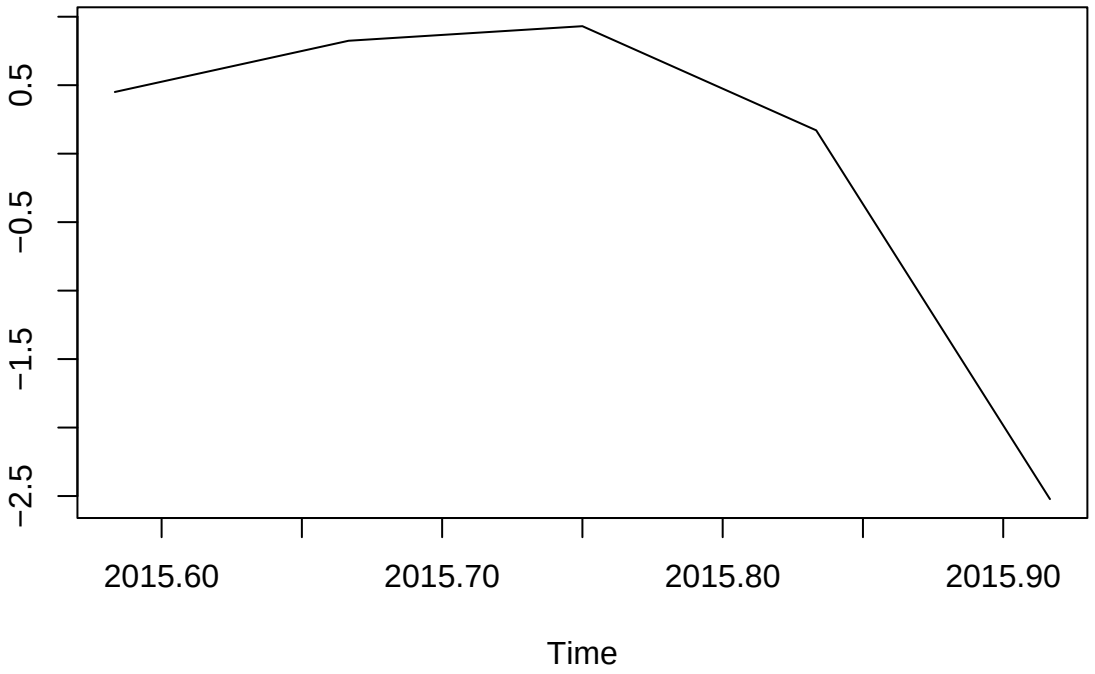
- à partir de mai 2015

```
s2 <- ts(data = rnorm(36), start = c(2015,5), frequency = 12)
s2
```

```
##               Jan         Feb         Mar         Apr         May         Jun
## 2015                                                    0.58250279 -0.34253992
## 2016  0.77956780 -0.14250831 -0.83252120 -0.20826894  0.23517661  0.18671712
## 2017 -0.01714560  0.53455225 -0.31250177  0.41146006 -1.18473658  0.59936250
## 2018 -0.84979256  0.32078641  0.91618622 -1.29889974
##               Jul         Aug         Sep         Oct         Nov         Dec
## 2015  0.56251809  0.45043606  0.82449910  0.93074103  0.17046389 -2.52232257
## 2016  1.12813032 -0.42824335  1.64744681 -1.19731044  0.39708851  1.20270532
## 2017  0.40768020 -0.94245360  1.41314011  1.05563593  0.04459494  0.57470777
## 2018
```

On peut aussi zoomer sur la série avec l'instruction window

```
plot(window(s2,start=c(2015,8),end=c(2015,12)),ylab="")
```



- Création de

QUESTION SNCF LAAA

```
data_sncf_mens = read.table("data/SNCF-Mens.txt")
```

le trafic voyage SNCF de 1970 ya une tendance qui s'est dégagé d'une facon net et croisaante. Avant les années 70 peut etre les gesns prennait pas trop le train e

on utilise la fct différence pour *** la tendance

observé trend = tendance